Message

From: paul orbuch [Ex. 6]
Sent: 4/6/2018 3:23:01 AM
To: William Tookey [Ex. 6]; Michelle Hamilton [mhamilton@silverton.co.us]; Louis Fineberg [LFineberg@silverton.co.us]; [Ex. 6]; Peter Butler [Ex. 6] diane.McKnight@colorado.edu [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=78c46c044c894668a3588e894beb5e5b-diane.McKnight@colorado.edu]; Joseph Ryan [joseph.ryan@colorado.edu]; Ryan T. Bennett [RBennett@rcflp.com]; Thomas, Rebecca [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=36f74071306a432c9f07eea3fa16ca96-Thomas, Rebecca]; sdempsey@coloradomining.org; Benevento, Douglas [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93dba0f4f0fc41c091499009a2676f89-Benevento,]; Milofsky, Robert [Milofsky_R@fortlewis.edu]; Rudolph - CDPHE, Mark [mark.rudolph@state.co.us]; kchadwick@fs.fed.us; Priscilla Nelson [pnelson@mines.edu]; Dr Figueroa [Ex. 6]; Krista Doebbler [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=user735b3804]; Bob Arnott [boba@seaenv.com]; Rob Runkel [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=user77326f33]; Smidinger, Betsy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=08e9600128ad456d9df9ba1cb816aa8e-Bsmiding]; Peterson, Cynthia [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=11d613d49e684c1589f57b933576057c-Peterson, Cynthia]; Kelly, Albert [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=08576e43795149e5a3f9669726dd044c-Kelly, Albe]; Nordstrom, D Kirk [dkn@usgs.gov]; Devon.Horntvedt@newmont.com; jwillis@tu.org
CC: marcie@mountainstudies.org [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=c87b9fe7de2b40de9e216ff0610e6ef1-marcie@moun]; Page Buono [page@mountainstudies.org]; Priscilla Sherman [priscilla@mountainstudies.org]
Subject: Wednesday, April 11 10am mdt - Science and Innovation Center Steering Committee Conference Call
Attachments: QuestionnaireResponsesMemo4.5.pdf; AML-GoodSamApril26-2018.pdf; MinesInnovationWeek_v11x17 (002).pdf; 03152018_Inno Expo Sponsorship packet_STEERING COMMITTEE.docx; ScInC Steering Comm Notes 2018.02.01.docx

Hello Mountain Studies Institute Steering Committee for the Science and Innovation Center:

Here is your reminder and information for our scheduled 75 minute conference call next **Wednesday, April 11 at 10am mountain.**

Conference Call Number
United States: [Ex. 6]
Access Code: [Ex. 6]

Most important to do in advance of the call is to please take the time to review the questionnaire responses in the first attachment below as we want everyone on the Steering Committee to understand the range of views of your colleagues as we together build a vision for the Center. We believe the responses to the questionnaire demonstrate that there is a consensus building within the Steering Committee on the benefits that a Center can provide as well as the challenges that we will need to overcome to establish it. We received 13 in-depth questionnaire responses from Steering Committee members. Thank you!

April 11 10am Conference Call Goals
A) Gain clarity on Steering Committee member views/ideas based on Questionnaire Response Memo and discussions (memo attached)
B) Assess Steering Committee member attendance at April 26 Good Sam meet in Golden and School of Mines Innovation Week event) (see attached agendas)
C) Review MSI's August 28-30 Silverton Innovation Expo and proposed Steering Committee role (prelim agenda attached)
D) Identify other upcoming events and related initiatives to track
E) Consider next steps for continued scoping and refining of Center concept

PRELIMINARY CALL AGENDA

1) Introductions and Steering Committee New Members-

Jason Willis, Trout Unlimited (environmental group)

Devon Horntvedt, Newmont Mining (industry rep)

2) Questionnaire Memo Review

* Please be prepared to quickly highlight one issue/answer from your questionnaire response that you want to share with your colleagues

* How should the Center concept at this stage address the legacy vs. new mining issue?

* Business plan, marketing plan, feasibility study . . . what type of document is needed to help define and promote the Center concept?

3) April 26 Golden Meets/Events (see attached Good Sam and Innovation Week agendas)

SC members attending?

4) MSI August Expo (see attached Innovation Expo agenda)

Description of event and proposed Steering Committee role

5) Other Upcoming Events or Related Initiatives of Note

EPA, BLM, etc., Bonita Peak Mining District Innovative Technologies process - see https://semspub.epa.gov/work/08/100003642.pdf

6) Next Steps/Adjourn

- Options for getting a biz plan/marketing plan/feasibility study done
- Update to current vision statement/prospectus with questionnaire responses and SC edits
- Fundraising
- Request to Steering Committee to keep sending information and ideas to MSI or all
- Future meet and/or conference call

Along with the other attachments, the final attachment below is the document recapping our initial call from February 1 that your previously received.

Please contact me or Marci if you have any questions before the call next week. Thank you!

Paul Orbuch (on behalf of Mountain Studies Institute)

Ex. 6

SILVERTON INNOVATION EXPO

Supporting the Evolution of Reclamation & Mining in the Rocky Mountain West
Hosted by Mountain Studies Institute

August 28 – 30, 2018
Kendall Mountain Center, 1 Kendall Place, Silverton, Colorado

Building on the successful launch of the Innovation Expo in 2017 and years of organizing the San Juan Mining & Reclamation Conference, Mountain Studies Institute is proud to host the second annual Silverton Innovation Expo. Join us to re-envision and revitalize the future of mining and reclamation!

ABOUT THE SILVERTON INNOVATION EXPO

The Expo will: provide a forum for discussion and exchange of ideas, offer prime opportunities for exhibitors and speakers to showcase their innovative future technologies, and allow time and space to build partnerships with other stakeholders.

Priorities defined by participants of the first Expo:

1. Demonstrate the potential of a Center as a showcase for Innovation.
    1. Includes surveying companies to support developing their ideas and address barriers of demonstrations and testing
2. Offer a boot camp for businesses that addresses how to support businesses from bench test to market
3. Clarify testing and criteria for the evaluation of ideas
4. Addressing liability
5. Offer networking time and space for innovators, industry representatives, scientists, creators and customers
6. Train future generations
7. Facilitate access to sites for companies and researchers

2018 INNOVATION EXPO OBJECTIVES

Innovation & Technology Center Concept
Attendee Input & Next Steps

Addressing Liability
What can we do? How?

Re-mining + Reclamation
Technology and Demonstrations

State of the Science:
Updates and Outlooks

Now in its second year, the Innovation Expo will offer updates and advancements based on these priorities. In 2018, we will push boundaries and barriers to innovation by exploring issues and addressing challenges identified in 2017. In an effort to further the conversations launched at the inaugural Innovation Expo, the agenda this year provides ample opportunities for demonstration of the science (including a Center), as well as

Silverton Innovation Expo is produced by Mountain Studies Institute with support from the Coutts and Clark Western Foundation and others. Visit mountainstudies.org/expo for more information.

relevant tools and updates for navigating legal hurdles. Last year we identified potential economic opportunities associated with mine reclamation, and this year, we'll provide tools that move those ideas to market.

Like the first year, this unique Expo will be a meeting of the minds, bringing together industry representatives, businesses, government agencies, scientists, nonprofits and citizens to explore the need and opportunities for innovation through expert presentations, networking opportunities, poster sessions, trainings, and field tours of active reclamation sites.

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SILVERTON INNOVATION EXPO

EXPO ITINERARY - TENTATIVE

Tuesday, August 28th

9 am – 10 pm	Welcome & Speaker	
10 am -12 pm	Site Tours	
12 – 2 pm	Lunch Break	
2 – 5 pm	Opening Session	State of the Science, Demonstrating the Center
6:30- pm	Reception	State of the Science, poster session
7- 8:30	Voices from the Water	An evening of storytelling connecting us to the water that flows from the San Juan Mountains. This evening will highlight stories from a partnership of the Raven Narratives, the Silverton Theater Mine, and Mountain Studies Institute.

Wednesday, August 29th

9 am – 10 pm	Welcome & Speaker	
10 am – 12 pm	Business Bootcamp	
12 – 2 pm	Networking Lunch	
2 – 3 pm	Innovation Center Updates	Panel of Steering Committee Members
3-5 pm	Pathway to Innovation	EPA Process: How You Get Through
6:30- 8:30 pm	Reception: San Juan County Historical Museum	

Thursday, August 30th

9 am – 10 am	Welcome & Speaker	
10 am – 11 am	Demonstration of the Science	Presentations
11 am – 3:00 pm	Demonstration of the Science	Tours
12:30 – 1:30 pm	Bag Lunch in the field	
3 – 5 pm	Legal Review	What can we do without Good Sam & within CERCLA?
6:30- 8 pm	Steering Committee Dinner	Group dinner? Happy hour debrief at MDC?

Silverton Innovation Expo is produced by Mountain Studies Institute with support from the Coutts and Clark Western Foundation and others. Visit mountainstudies.org/expo for more information.

SILVERTON INNOVATION EXPO

EVENT SPONSORSHIP

Exhibitors and industry representatives can increase visibility and support our efforts to re-envision the future of mining and reclamation with an Expo Sponsorship! Sponsor support is critical to the success of the Expo, and allows us to create a visionary event that is affordable and open to the public. You will receive valuable exposure to an audience of decision makers from Colorado and beyond. A variety of sponsorship levels are available in the $500 to $5,000 range, with associated benefits.

	Platinum Presenting Sponsor $5,000 (one available)	Gold Sponsor $2,500	Silver Sponsor $1,000	Bronze Sponsor $500	Exhibitor $250
Table in registration area	X				
Verbal recognition throughout Expo	X	X			
Brochures at registration table	X	X			
Recognition in press releases*	X	X	X		
Opportunity to hang # banners	3	2	1		
Recognition on poster/program/ads*	Logo	Logo	Logo	Name	
Recognition on Expo website*	Logo	Logo	Logo	Name	
Recognition in social media	X	X	X	X	
Name & description in Expo program	X	X	X	X	X
One exhibitor table	X	X	X	X	X

*Logo size and recognition level will increase with sponsorship level.

If you are interested in sponsoring the Silverton Innovation Expo, please contact Tiffany Carlyon at tiffany@mountainstudies.org. Register early—before May 30 for full benefits. Please note that some benefits may not be available for sponsor commitments received after July 30, 2018.

Silverton Innovation Expo is produced by Mountain Studies Institute with support from the Coutts and Clark Western Foundation and others. Visit mountainstudies.org/expo for more information.

Good Samaritan Protection to Enhance Abandoned Mine Land Cleanup—Finding a Path Forward

April 26, 2018 – Colorado School of Mines -- 8am to 5pm

The **Mining and Metallurgical Society of America**, in conjunction with the **Colorado School of Mines** and **Trout Unlimited**, presents the Summit: ***Good Samaritan Protection to Enhance Abandoned Mine Land Cleanup -- Finding a Path Forward***, to be held on the Colorado School of Mines Campus on April 26, 2018.

The Purpose of the Summit is: Identify necessary liability protection from applicable environmental laws that advance closure and remediation of the identified pilot/demonstration projects.

The Summit's Outcome is: A diverse coalition of stakeholders working to advance pilot/demonstration project-focused Good Samaritan legislation that enhances (or advances) AML cleanup.

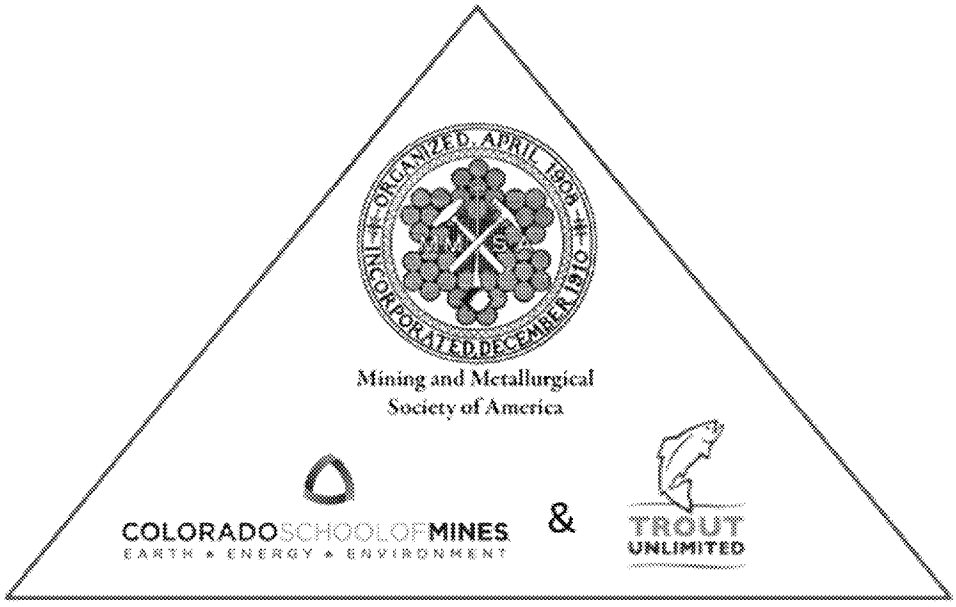
The topics and summit breakout session discussions presented at the Summit will be:

- **Laying out the Challenges**. Identify social, political and legal issues impeding closure and remediation of AML Lands, including: What is needed, State Government considerations, Environmental Coalition issues, Private Sector & Industry considerations, Congressional Representative discussion.
- **Existing Issues Impacting AML Clean-up**. Address social, political and legal issues related to AML cleanup within current regulatory structure and envision potential Good Samaritan protections. Issues to be discussed include: Legal, AML/Good Samaritan, Health, Safety & Environmental, EPA discussion of Good Samaritan.
- **Break-out and Planning.** Delegates will break into multiple working groups to build consensus on the critical language and programmatic components needed to advance Good Samaritan legislation focused on pilot/demonstration projects. After the building blocks for the legislation are identified, avenues for partnership, the ideal process for selection of candidate demonstration sites, and other issues raised by the morning sessions will be discussed.
- **Feedback and Actionable Items.** The goal of the final session is to fold in outcomes from the morning and early afternoon sessions to collaboratively establish an action plan.

This Summit is intended for all stakeholders in the public, private and civil sectors with an interest in accelerating the clean-up of abandoned mines through Good Samaritan legislation.

For more information about the Summit, and to participate, contact Betty Gibbs, Executive Director, MMSA, at contactmmsa@mmsa.net or 303-444-6032. Watch the MMSA Web page for updates: http://www.mmsa.net.

Sign up for your *FREE* ticket.



Good Samaritan Protection to Enhance Abandoned Mine Land Cleanup - Finding a Path Forward

April 26, 2018 – Colorado School of Mines – 8am to 5pm

SUMMIT AGENDA—DRAFT—02-13-18

Purpose: Identify necessary liability protection from applicable environmental laws that advance closure and remediation of the identified pilot/demonstration projects.

Outcome: A diverse coalition of stakeholders working to advance pilot/demonstration project-focused Good Samaritan legislation that enhances (or advances) AML cleanup.

Morning Plenary Session (8:00 to 10:00 AM) - Laying Out the Challenges
Laura Skaer- Session Moderator

Session Objective: Identify Social, Political and Legal Issues Impeding Closure and Reclamation of AML Lands.

- Enhanced pathway to AML Cleanup – ***Laura Skaer;*** Executive Director, American Exploration & Mining Association
- State Government Considerations – ***Jeff Graves;*** Director, Office of Active & Inactive Mines, Colorado Division of Reclamation, Mining, and Safety
- Conservation Group Perspectives – ***Chris Wood*****;** President, Trout Unlimited
- Private Sector / Industry Considerations – ***TBD***;
- Congressional Perspective – ***Dustin Sherer*****;** Aide to Sen. Cory Gardner

Break (10:00 to 10:15 AM)

Mid-Morning Session (10:15 to 11:45) – Issues Impacting AML clean-up
Dennis Ferrigno - Session Moderator

Session Objective: Address Social, Political and Legal Issues Related to Enhanced AML Clean-up

- Legal Issues- ***Carolyn McIntosh;*** Partner, Squire Patton Boggs.
- AML / Good Samaritan Political Issues – ***Kathy Benedetto;*** Senior Adviser to the Director of the Bureau of Land Management ***(Invited)***
- Examples of Successful Reclamation and Closure (Processes and Results) to Guide Candidate Site Selection – ***Jeff Parshley;*** Group Chairman and Corporate Consultant, SRK Consulting North America
- Discussion for Good Samaritan Initiative – ***TBD,*** U.S. Environmental Protection Agency ***(Invited)***

Lunch (12:00 to 12:45 PM) - *Compliments of MMSA*

Afternoon Session (12:45 PM to 3:15 PM) - Break-out & Planning
Ann Carpenter - Session Moderator

Session Objective: Build Consensus on Best Paths Forward

Delegates will break into multiple working groups to build consensus on the critical language and programmatic components needed to advance Good Samaritan legislation focused on pilot/demonstration projects. After the building blocks for the legislation are identified, avenues for partnership, the ideal process for selection of candidate demonstration sites, and other issues raised by the morning sessions will be discussed.

Break (3:15 PM to 3:30)

Summary Session (3:30 PM to 5:00 PM) - Feedback and Actionable Items
Ann Carpenter - Session Moderator

Session Objective: The goal of the final session is to fold in outcomes from the morning and early afternoon sessions to collaboratively establish an action plan.

Closing of Summit (5:00 PM)

For more information about the Summit, and to participate, contact Betty Gibbs, Executive Director, MMSA, at contactmmsa@mmsa.net or 303-444-6032. Watch the MMSA Web page for updates: http://www.mmsa.net.

Sign up for your *FREE* ticket.

MINES INNOVATIONWEEK

WEDNESDAY, APRIL 25

CEEN 360 FoodBuild
7 p.m., Marquez Atrium

THURSDAY, APRIL 26

CECS Capstone Design@Mines Breakfast
7:30-9 a.m., Student Center Ballrooms

CECS Capstone Design Showcase
9-11 a.m., Lockridge Arena

IDEAs, EGSCP and Thorson First-Year Honors
1-3 p.m., CoorsTek Lobby

Undergraduate Research Fair
1-3 p.m., CoorsTek Lobby

Newmont Challenge Finalist Pitches
3-4 p.m., Lockridge Arena

Innovation & Design Awards
4-5 p.m., Lockridge Arena

Alumni Association Reception
5-6 p.m., Lockridge Arena

WEDNESDAY, MAY 2

EPICS 151 Cornerstone Design Competition
5:30-7:30 p.m., Student Center Ballrooms B&C

CSCI 101 Poster Fair
7-9 p.m., Student Center Ballrooms

THURSDAY, MAY 3

The Wright Awards
All Day, Lockridge Arena

FRIDAY, MAY 4

The Wright Awards
All Day, Lockridge Arena

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Mountain Studies Institute
Science and Innovation Center Steering Committee Questionnaire
Summary of Steering Committee Responses
April 2018

Thirteen questionnaire responses were received from Steering Committee members. Thank you! What a great repository of information and views on the Science and Innovation Center concept. We plan to refer back to this information on a regular basis as we continue to scope the Center concept with you.

The information below is MSI's best initial effort to compile, summarize, and group responses in a manner that will help guide the Steering Committee going forward. *Please take the time needed before our April 11 call to review the responses herein as we want everyone on the Steering Committee to understand your colleague's views as we together build our vision for the Center. We believe the responses to the questionnaire demonstrate that there is a consensus building within the Steering Committee for the benefits that a Center can provide as well as the challenges that we will need to overcome to establish it.*

After our April 11 conference call discussion, we will likely use this document to create/refine other materials including speaking points, revision to the vision statement/prospectus, fundraising proposals, etc. Please let us know if you have other suggestions.

A) <u>Highest priority hard rock mining challenges.</u> (Not in order of priority but bunched into four categories so you can see areas with greater emphasis.)
1) Health/Environmental
2) Financial/Economics
3) Informational/Educational/Technical
4) Other

<u>Health/Environmental</u>
Unknown physical safety hazards to humans

Environmental risks from acid rock drainage. Specifically in the BPMD:
1) more innovative treatment of adit waters
2) responsibly making changes to surface flows to reduce AMD loading
3) making correct conclusions about data and implementing good team practices
4) assisting in the search for reducing sludge production and sound sludge storage/disposal
5) inclusion of land and habitat preservation in AML solutions

Water treatment is effective on a technical basis to meet cleanup goals

Water quality issues below/beyond the mine

Liability protection for 3rd party clean-up of abandoned mines in order to protect, restore, reconnect, and sustain our nation's cold-water fisheries and resources.

Mine waste remediation. Now that some are draining into the pipe, how does that change what its needed for remediation (waste/soil management)?

Water. Efficient treatment… ideally in a form that produces the lowest possible sludge volumes with power requirements that could be met by on-site renewables, or as a passive/active system that utilizes some remedial elements which allow dissolved metals to be deposited in the system for longer durations. Clearing up regulatory hurdles also remains a high priority, both in providing new opportunities for cleanup and in supporting local volunteers and watershed groups in their efforts.

Financial/Economics
Water treatment is cost effective for long-term operations.

Lime water treatment is an effective means for water treatment but not a long term cost effective option from the state perspective.

Remedial actions that have long-term effectiveness and have lower cost (comparatively to current standards) long term maintenance and operations

Silverton is focused on tourism- based recreation. The idea of technology industries locating here and their supporting infrastructure would be much more beneficial and would bring diversity to the economy and sustainable jobs.

Lack of funding for the AML program

We have to understand the value of waste, water, and tailings and other externalities. Otherwise it's very difficult to permit the mine of the future. The opportunity here is legacy issues or potential future legacy issues around water and waste. In order for the mining companies of the future to be able to permit these mines, we need to establish solutions to avoiding waste and water going forward.

Methods to repurpose metal sludge, whether milling or using as is. Create markets.

Informational/Technical/Educational
Need to understand the systems beyond the band aid.

Need to engage students and the public in the process and the solution.

Provide scientific and technical expertise to other entities who need hydrological, geological, and geochemical assistance and/or educational information on the characterization and remediation of legacy mine sites.

Making the infeasible feasible- two parts (1) scientifically understanding of the issue so you can deal with it, and (2) reducing the cost of dealing with it.

Metals we are dealing with are specific to each drainage and offer opportunities to study them with multiple unique sites from one general location. There is also the potential to study new metals that have not yet been mined but may be in the future.

Engage undergraduates in fundamental and applied research that could be conducted on-campus as well as in the field. The STEM departments are well staffed with research active faculty wishing to expand their projects to attract students. A new environmental science option is approved for the Fall 2018 semester, and the College will be acutely interested in attracting new faculty with research projects that match the "needs" of the 4-corners.

Legacy issues and preventing these from being legacy issues for the future. Solutions for draining mine adits in SJC to address BPMD. There is also lots of talk about banning sulfide in the Midwest- what they really want to deal with is AMD. So if we can avoid that, we can have solutions (passive (preferred), or active), better characterization and better mine planning.

Other
Establishing a process/center to foster the advancement of alternative treatment technologies for both AMD and active mine treatment. This priority possibly cannot be achieved within the present broad committee diversity but rather through a carve-out of interests. Need to demonstrate a benefit for the active mining interests, including Agency acceptance of results, to achieve significant buy in and participation from these entities.

B) Lower priority challenges that can be addressed or other benefits that a Center can provide that would bring value to you and your constituency. (Not in order of priority but bunched into three categories so you can see areas with greater emphasis.)
1) Informational/Educational/Technical
2) Financial/Economics
3) Governmental/Stakeholders

Informational/Educational/Technical
Innovative cleanup technologies for acid rock drainage such as: monitoring, gear testing, report reviews and 3rd party data review.

This Center will operate as a think tank for environmental remediation.

Civic engagement and community service opportunities for youth.

Research and innovation directly related to legacy mining, independent of EPA.

Building additional communication tools for the general public and development of approaches to best address socio-economic, infrastructure and other potential community based issues.

Provide students with the opportunity to interact with experts in academia and the private sector. A center could also provide students with insights into how the private sector and government collaborate. Students majoring in disciplines outside of STEM (e.g., business, environmental studies, journalism) could also benefit from innovations and ideas from the Center.

Local issue is properly characterizing background- there is a reason that these deposits are there. Also feel that there is a show down coming up between agencies and mining community. Somewhere out there sits good science. Good science in characterizing true background is very important for BPMD and new sites around the world. There is an overwhelming amount of natural loading and finding the line where we as a society will accept the answers from science will be the challenge. Science agendas- need to establish ways to address bias and mistrust at the start.

Defining "success" with regards to treatment technologies and standardizing pilot technical approaches.

Financial/Economics
The economics of the cost opportunities is untouched yet. We appreciate processes that have useful, practical outcomes. Useful is defined as saving money and improving water quality. [expensive technology exists that is not feasible due to cost] The Center could look to solve issues and reduce costs.

Increased or a dedicated funding source. With the proposed elimination of EPA 319 NPS funds, AML funds are continually taking a hit. Instead of cutting programs to clean-up abandoned mines, we should be focusing on establishing funding sources.

Tangible results to the efforts-
- Benefits to other mine owners
- Tangible plans in place to identify, attract and support businesses

Governmental/Stakeholders
Agencies are still silos, and also not sharing data and information. They are acting like PRPs as per recent legal ruling.

The Center can be the space to bring a wide spectrum of stakeholders together and suggest concerns that we have not yet addressed.

Developing collaboration, relationship and opportunities for community building among all stakeholders, along with better lines of communication.

Mediating the space to collaborate will need to be intention. Stakeholder mapping will be critical to map agendas and establish a process. Include all stakeholders with an organizational structure with a collaborative approach with different views.

C) What are the key challenges you foresee in developing a Center to address your hard rock mining priorities? (Not in order of priority but bunched into four categories so you can see areas with greater emphasis.)
1) Funding/Staffing
2) Focus/Scope/Organization
3) Liability
4) Accessibility

Funding/Staffing
Funding. But, with adequate funding, some of the other challenges will be solved. The wide variety of topics and individual expertise that come to the table for discussion will mean that very different perspectives will lead to problems with communication and any consequent activities.

The capability to develop an interim and longer-range funding strategy.

Staffing and funding challenges are the key barriers. If hiring new staff, finding someone with a specific skill-set to address AML clean-up will be the biggest challenge from not only a technical perspective, but also a policy. Funding entities do not like to provide dedicated resources to salary without tangible on-the-ground improvement. Finding private donors to provide unrestricted funding will be a key.

Federal agencies use to coordinate and meet on a regular basis but funding and staffing challenges have made it to difficult to continue regular coordination.

Staff members will be needed, not only to keep track of meetings and activities, but also to coordinate continually with State and Federal agencies and professional society meetings. Then there are non-professional society meetings and staff members will need to compile available information for funding possibilities.

Reduce costs for trials (dorms, inexpensive housing) to reduce company costs to test and explore. AMD testing is a fall season, or maybe winter and spring- extend the season. Treatment can be a year round activity, and accessible on certain roads. Instrumenting with sensors that could be monitored remotely year round.

Funding and the ability to build trust among agencies, stakeholders and industry.

Funding to build center and the capital needed to get it started. Governmental and legal issues I feel we can get around and feel strongly that there can be projects of NPL caliber that can be brought into the program for actual real project scenarios and meaningful research.

Funding, and the time (primary resource) to work on it- buy professors out of teaching obligations. Want mine-water on tap. Not sure we are speaking the same language of what and why an institute must have a compelling vision and mission. If you make it too small, its not compelling. If it's looking at two Superfund sites, may be compelling with a 5-10 year scale so aim big.

Innovation- reducing costs, cost-effective methods, level of clean up is limited by cost. What has been done is what is feasible/cost affordable. Tech changes costs.

The two biggest obstacles that we foresee are securing a facility and funding it.

Focus/Scope/Organization
Development of a concise, achievable vision and "business" plan given the existing diverse interests represented.

Need to be clear as to Center's role in active vs. legacy mining issues or is it both?

Formulating a manageable process to develop and allow a meaningful outcome in a reasonable timeline.

Regulatory agencies are not our focus. Our focus is to understand. Industry doesn't like being unasked and told what to do. Regulatory driven is very prescriptive without knowing how the system is working. Don't let them limit future options. We need a broad look, beyond one site or situation. Not one way of doing it, no absolutes. Understand different options and possibilities.

Superfund designation helps with studying stuff. Pilot tests without a permit. Big difference with any other place. Most superfunds are limited in scope. This one is not. We have a lot of drainages with different problems- so lots of variety in concoctions and solutions, concentrations.

Physical centers, operations model, who owns it, who is it serving, liability, designs programs. Who is in control of the program/partnerships and what is the community tie?

Large database to compare information- we will be the source of information about abandoned mines in US. Be the US linch-pin, world-wide leader of abandoned mines. Establish and support the state of the practice and present honest and unbiased information. Mobilize the students and citizens, develop real time data flows, invite anyone to do research with these resources, teachers, and students.

Coordinating the efforts of the large group of entities on the Steering Committee.

Bias. And Management. How do we manage the individual stakeholders to be productive? Establishing performance measures- key performance indicators. Would be good to establish these early and with intention. Set goals and objectives with measureable outcomes.

Proving tech to everyone's satisfaction.

Liability
Public-private cooperation is necessary but misunderstandings can easily lead to litigious situations. Hence, very clear ground rules for cooperation must be documented and agreed upon at the start.

Cleaning water quality is a political issue, with liability, etc. Shift the equation by figuring out a potential for profits. Rico and a passive system for here- we would be selling acids. BLM, EPA and USFS legal hang ups take time/effort to overcome.

Accessibility
Another barrier is the challenge of getting to Silverton as flights/driving not easy. Clear Creek is closer to a lot of people and similar issues.

Previous conversations of a testing facility

- BLM has land that is to the south- closer to the ski area.
- There is another site where the pipeline comes through for RB, above Gladstone.
    - Challenges were concerned about if a mining claim would shut down the ability to move forward. Could ask BLM to withdraw the mineral rites to keep that from happening.
- Design: access to water, tanks, counter, drains, bench and plumbing.
- Keep using the lab in Durango- don't need our own ICP machine.

D) Are you aware of other initiatives or entities with similar goals/missions? How could the Steering Committee and eventually the Center itself best work with these entities going forward?

Other organizations with similar goals include:
INAP (International Network for Acid Prevention)
ADTI (Acid Drainage Tech Initiative)
SME (Society for Mining, Metallurgy and Exploration)

EPA's Office of Research & Development, Animas River Stakeholder Group, BPMD Citizen Superfund Group, and Trout Unlimited AML

The Summitville Superfund Site has been offered up for a similar purpose and could be used by this group as well. Objective is to promote the State's goals of providing options for long-term fiscal efficiencies.

Clear Creek has similar issues in terms of AMD, but not sure how much space they have or ability to test things there. They are much closer to Denver and School of Mines, so clear advantage in being easy to access and in the Denver water supply.

Consider the Colorado College model where counties pay into supporting the college and/or draw from partners- CDPHE, SJ Development.

EPA ORD research and technology efforts. Possible some Western State based technology activities. Private party research centers and a compendium of known approaches (which I suggest may not be well "catalogued")

DOI Office of Surface Mining, Reclamation and Enforcement -- Acid Drainage Technology Initiative (OSMRE ADTI)

There are associations, but this initiative is unique.

- Mine industry
- Academic- Dirck Vanzel, University of British Columbia with Priscilla Nelson
- Luke Danielson, Western U- they are looking to Ben Butler Mine, north of London mine on BPMD, Bill Simons key focal area- waste rock, then a burn zone down the slope near Denver Hill. They wanted to come up with an easy solution that enabled academic and students to come in with easy modifications. Looking to have Fort Lewis involved, and Uof C, putting together a group to use this project and do other small projects, where the underlying owner does not have responsibility.
    - Josh Parrell, working on the CleanTech Challenge. Represents the RCF and Jolymont interests.
    - Larry no longer part of Jolly Mont. He is the COO of New Tracks, headquarters are in Montreal. Looking to fill the role that Larry filled.

E) There are potentially a number of ways to structure and/or operate a Center or Centers. These include, a physical location near mine sites, a virtual network, a hosted entity, etc., or a combination of the foregoing. Please provide your list of advantages and disadvantage to each of these three options?

Having a center near mine sites is most helpful. For example, if the Center was located at Durango with a field office in Silverton as a base camp for field and educational activities, that might be ideal.

Since DOI is considering reorganization, might want to focus on a USFS co-location in an area of greatest need. If multiple Centers are in the picture, I would propose locations in or near a technical university town would be a good choice. NM School of Mines, SD School of Mines, CO School of Mines, MT Tech, etc. A virtual set-up would not be impossible, and may be the most financially viable way to get a Center up and running short-term.

These structural approaches are not mutually exclusive and probably complementary for the technology aspects of a Center. Suggest dividing the Center into Centers of interest and then ask this question of specific interested constituencies. For socio-economic or infrastructure priorities, I see no advantage to a location other than impacted community(s) with perhaps a master host location. For technology a hosted entity would likely fan out to both an in-situ location as well as virtual networks (assuming I understand this broad undefined term).

A center located in or near Silverton with opportunities in the region close by to test and implement projects would be preferred. A combination of on site (center location in Silverton to run laboratory tests) and the need for onsite satellite "sheds" or "structures" that will ease in the ability to effectively implement this.

More of an institute as it's less limited than a Center. Institutes have centers within them. There are lots of centers that can be under the umbrella. Coalition of partners and sites. Institute umbrella, coalition of centers or partners. Could be individual

members, organizational members. People who buy into the mission and intend to be part of it. Could be top down (bylaws, committee structure), but limited appeal. If you play it right, it would be grassroots and inviting in.

Start with the two Superfund sites (BPMD, Clear Creek) and mobilize the state and citizenry. Have founding members and create a high-level mission and intellectual development.

Past good ideas-

- Denver meetings with high-level EPA managers.
- Working with DC staff to help understand the situation.
- Don't get involved in Good Sam
- Getting them on tours- need to see the ground.

Onsite classroom environment with hands-on learning that facilitates access. Consider whether this is field school level, or more polished- professional lab. Include dormitory or visiting professors space and lab/presentation space. Also need showcase area- stage, library, or exhibit hall.

A physical space for the center in Silverton is a good idea. This would be a physical location for people to stop by, as well as the center for a coinciding virtual network. Having the center in Silverton would also benefit from the continual agency involvement through the Superfund site. Disadvantages to this would be the isolation in Silverton. It is not an easy place to get to for most of the State so being willing to travel to conferences and keep up an online presence will be essential in maintaining the visibility of the center.

Virtual Network: Given Silverton isolation, I think a combined approach to a virtual network run out of a physical location in Silverton would be a great idea. This would allow interaction with experts across the US and world to provide input on ideas and problems. Disadvantages would be a stand alone model. This needs to be combined with an actual location where bench scale studies could take place, and staff are available to meet with agency folks and other partners.

Physical location advantages

- Provides a place where different users can more readily collaborate
- Provides a place that is proximate to hard rock mining historical sites providing easy access for field work, etc.
- Gives a more tangible identity to the Center
- More likely attracts a range of science/business groups to address challenges

Disadvantages

- Cost and time frame - longer to get up and running than a virtual network

Virtual location advantages

- Likely less expensive and would likely be operational in a shorter time frame

Disadvantages

- May be too much of a hurdle to get a true Center - disperse user groups would have limited time/opportunity for face-to-face discussions
- More challenging to conduct lab and field work as a collaborative project

A physical location would give credibility, credence, and facilities to advance tech innovation and startups under some level of supervision/guidance and provide for a centralized certification. I believe these elements will all be critical to the success of the Center's mission. The real hurdle there is cost. A virtual presence could be a solid place to start, however. Develop the coalition, create guidance, and establish the credibility via vetted articles, insights, and leadership via conferences/outreach

- A variety of structures, needs to fit objectives. Facilities research around key subjects, not simply academic endeavor. How do you make it an economic endeavor? Are we doing work for the industry in general? Unlikely to get economic returns? Are we taking on specific projects that offer industry specific players? Working for agencies? How can you make money doing what we need to be doing?
- Need to understand the market- what does it look like? How do we serve that market? Design the center around that market? Opportunities for self-funding activities?
- Endowment? Sponsored by industry and society? The good is the return, dealing with the long-term problem.
- Hybrid- Create the technology- hire engineers and scientists to create tech as a part of the center (instead of conveying other people through the process).
- Endowment space- ESG type funding, looking to fund endowments that have returns on investments. Could think about how to design a concept, could reach into that funding model if the right foundation exists out there. May be a good match up, funds for the environment, a return on investment. Hewletts, Packards, Tiffany, foundations that put will appreciate a compelling story that seeks to address the consequences of mining.

F) Resource and funding for scoping, start up and long term operations of a Center will be required. Please provide your suggestions for short and long term funding and resource options. Short term might include governmental, industry, academic and philanthropic options. Long term could include those options, and/or some type of fee structure for users of the Center.

The potential funding description above is good and I would support it. Of course, the lawyers would have to look at what options will need careful appraisal to avoid litigation, misunderstandings, and especially incorrect perceptions. Dominant support by any single entity (e.g., one mining company or just a consortium of government regulatory agencies) must be avoided.

You need to engage people that can make funding decisions. In other words, agency personnel who can commit funds.

For operations, a relaxed schedule so that adjustments could be made when multiple problems arose. There are always going to be unforeseeable problems. Technology try-outs need time. Access to local machine shop is imperative.

Presently, I see it as an industry, academia and philanthropic endeavor.

CMA is mostly small producers, not the big companies that have resources to put into the Center or innovating remediation. Need to go higher in the food chain.

OSMRE funding opportunity
* need to develop operational model to determine what resources are needed and available- this will help drive it. Need to do a study to support the concept
* potential special district (tax or set aside) throughout the watershed- all the way down into NM to support the center, through a regional collaboration.
* round up program

A combination of funding sources will be needed. Grantors are apprehensive to provide money for personnel without on-the-ground results. Therefore, you will need a combination of un-restricted funding from private donors, mining companies, & partners to cover personnel costs while filling in the gaps with grant funds for project specific goals of the center.

Beyond a hoped for plan development grant, it is not easy to address funding absent a realistic "business plan". A team will likely be necessary to visit select foundation, etc., plus agencies for developmental funding. With a reasonable "business plan" it might be possible to generate interim funding from both public, non-profit and industry. The key will be to have a real plan to sell not just a vision.

Longer term the technology aspects of a Center(s) could attempt funding through a delegation process from EPA to manage technology development, vetting and tracking. At present, this process is often done by a for-profit contractor so there could be a benefit to the Agency. Another source of funding would be a full paid fee on the part of any technology proponent to use the Center's facilities, processes or approval process. (ala Good Housekeeping).

This really depends on the vision for the Center. How much of the Center's efforts will be as a business incubator? If a significant portion, is an SBIR grant a good way to go? Given budget constraints in the State of Colorado, it might be difficult to obtain funding from academia. Perhaps the steering committee could consider models like CIRES (at CU Boulder). If the Center was physically located in Silverton, it seems reasonable to develop a fee-structure for use of the facility.

- Foundation space- could be a fit
- Grant space- (not his specialty)
- Start up work- typically limited dollars
- High net worth individuals with the right agenda
- Industry sponsorship, participation. A challenge, especially in leaner times, the R&D element is often lagging. One could approach companies- Kinross, Newmont, Heclas, with presense geographically related or issue related. What is the return on the investment?
- Consulting firms, if business opportunity
- OEMs that might sponsor- if a pump manufacturer, may want to be a sponsor.

Need to answer the return on investment question for all of these- It's a few

Possible licensing if the center actually develops Tech, or JV situations with startups. Water rights/use? Clean water bonuses?? Hydroelectric? Repurposing/sale/broker cut if creating market for extracted metal sludges.

G) If a Center(s) is to succeed, what are the key partners in your view (in addition to the Steering Committee) that must have a primary role in its development and operation?

Key partners must include those who have a solid background in geological, hydrological, geochemical, chemical, microbiological, biological, mine waste management, and engineering related to metal mine wastes and their remediation.

The Federal Mining Dialogue, U.S. Environmental Protection Agency, U.S. Department of Interior, U.S. Forest Service, State Mining Departments, Local stakeholders, Contractors, and Colleges and Universities.

I see the various regional academia institutions that will be the key players in this. I feel the governmental agencies are support to the center. If there were to be a Summitville center, Rio Grande County would be a key player, so the counties and municipalities would also be key players in each center.

Clear Creek (Dave Holm) and Trout Unlimited (Jason Willis).
Doug Young, Keystone Center
Not sure regulators can be at the core of the formation.

Midlevel managers at multiple agencies- make presentations.
Hardest part is getting it be a sizable concept that you can manage. Flipping the equation to be about generating revenues, instead of balancing costs. Looking at marketable products. Doesn't need to make money, needs to just reduce costs. Target people who can generate revenue some how.

Local Counties,
Agencies- EPA, CDPHE, DRMS,
Business development orgs- Region 9,
Private agencies- colleges, universities,
PRPs- could they exchange liability for community investments? Incentives?
Offering a positive role in the development of the community
Up and coming entrepreneurs

Newmont, Sunnyside, etc., should be involved in the long-term viability discussion. This may give them the opportunity to develop or share some of their innovative technologies being used on larger scale sites. Other key partners would be EPA, USFS, BLM, DRMS, and other local and larger non-profits.

Key partners only for technology: EPA (federal rep); various State environmental management agencies; industry and NGOs with a demonstrated technical ability. Technology advocates should be invited to input to the development process sharing their knowledge and interests without having a "vote".

Need to define beyond the BPMD and look globally. Need to be designed to deal with this. We do not want to be defined by BPMD- it provides an opportunity but it does not define us. Need to make sure this is understood very early on.

All of the state and federal agencies which impose the regulatory/create the liability restrictions. Being able to provide a safe testing space for groups to work on water is a truly unique niche, and that can only happen if regulators are on board and encouraging the work. From there, industry will absolutely follow.

H) What is your organization's level of willingness to engage in the development of a Center(s) on a scale of 1 (not really willing) to 10 (extremely willing)? And by engagement we mean things, for example, such as serving on a work group to develop a charter or operating details for the Center and/or serving on an eventual Board of Directors of a Center.

Responses ranged from an enthusiastic 4 to even more enthusiastic 10s with everything in between. Workloads, funding, federal reorganization, retirements, etc., are factors that will limit folks ability to help but all members of the Committee expressed ongoing willingness to contribute assistance in one form or another.

I) What other issues do you think should be surfaced for the Steering Committee to consider regarding the potential for a Center?

Fort Lewis College is a 4-year, public, liberal arts college located in Durango, CO. We are the closest College to the proposed Science and Innovation Center and offer B.S. degrees in all of the STEM disciplines. The College has laboratory space for basic and applied research and a highly research active faculty. The Chemistry Department is well equipped and Geochemistry and Engineering reside in a brand-new state-of-the-art building offering a wide range of tools. The biologists in the Biology Department are all research active and well versed in the Animas River watershed.

A direct contact with State and Federal legislators will need to be a part of the Center. If innovative techniques and proposed legislation needs will be developed at the Center, making a difference with lawmakers will be essential. There is already a strong influence with staffers from the Durango area, but it will be essential in maintaining, and further including their input in the Center. The Steering Committee needs to figure out how best to utilize the Center. What I mean by this is not duplicating the efforts of partners in the area, but figuring out how to gather all partner ideas/goals and become the face of AML research in the SW.

The most important issue I see is the ability to develop a focused, manageable process with clearly delineated goals with achievable objectives, etc.

Even though more voices can slow things down or create a little chaos, casting as wide a net as possible early could help to continue the development of conceptual brainstorming, funding ideas and avenues, and identification of individuals really committed to making all of this go.
END

SCIENCE &
INNOVATION CENTER

Supporting the Evolution of Hardrock Mining and Reclamation in the Rocky Mountain West

February 1, 2018

Steering Committee Conference Call

On the phone: Marcie Bidwell, Paul Orbuch, Michelle Hamilton, Page Buono, Peter Butler, Kara Chadwick, Priscilla Nelson, Ryan Bennett, Rob Milosky, Rebecca Thomas, Joe Ryan, Bill Simon, Bob Arnott, Peter Butler, Cynthia Peterson, Mark Rudolph, Kris Doebbler, Stan Dempsey, Rob Runkel, and Betsy Smidinger on behalf of Doug Benevento *(listed at end of notes or contact sheet for full info)*

Center Scoping Issues to be Considered

- Distinction between legacy and active mining issues– Bill Simon
- Focus on mine acid drainage and/or mine waste technology for remediation – Peter Butler
- Evaluate what synergistic and divergent efforts are currently underway – Marcie Bidwell
- Draw from experiences in other institutes and countries– Ryan Bennett
- Consider federal technology evaluation new processes - Kris Doebbler and Rebecca Thomas

Recommendations for additions to the steering committee:

- Kim White, Silverton Schools – Michelle Hamilton
- Trout Unlimited, Jason Willis or Ty Churchwell- Rob Runkle,
- Mining Industry Representative (Kinross, Larry Perino/Pat Maily) – Stan Dempsey/Ryan Bennett

(MSI to follow up with recommenders on all three above)

Action Items:

- Review the prospectus (attached) and if feedback at present, please send to Marcie and Paul
- Marcie and Paul to schedule individual phone interviews with Steering Committee entities during month of February. List of questions to be provided in advance. Outcome to be Steering Committee Memo, White Paper and/or expanded prospectus. (Consider adding a timeline to next document.)
- Save the Date- 2018 Silverton Innovation Expo August 28-30 – Steering Committee meeting and dinner
- Next conference call –***DATE CHANGE*** **to Wednesday April 11th 10 am**
  (April 4 conflicted with CMA's 120TH NATIONAL WESTERN MINING CONFERENCE)

Upcoming Events of Interest:

- 120th National Western Mining Conference & Exhibition, Colorado Mining Association, April 3-5th http://www.coloradomining.org/general/custom.asp?page=NWMC_2018

- The Mining & Metallurgical Society of America, Colorado School of Mines- April 26th http://www.mmsa.net/

- San Juan Mining Conference, MSI/Uncompahgre Watershed Partnership, May 2-4 http://www.mountainstudies.org/sjmrc

- Silverton Expo – Mountain Studies Institute, August 28-30 http://www.mountainstudies.org/expo
- International Mine Water Association Annual Conference, September 10-14, Pretoria, South Africa https://eventegg.com/imwa-annual-conference/
- Mining Cleantech Challenge Call for Applications announcement, Announcement Date- 1-2-18; See announcement for details or contact Emily Long at Emily Long emily@coloradocleantech.com

Names and Affiliations of Call Participants

Name	Affiliation
Willy Tookey	San Juan County
Louis Feinstein	Town of Silverton
Peter Butler, Dr	Animas River Stakeholders Group
Bill Simon	Animas River Stakeholders Group
Kara Chadwick	San Juan National Forest
Stan Dempsey	Colorado Mining Association
Priscilla Nelson	Colorado School of Mines
Ryan Bennett	Resource Capital Funds/San Juan Land Holding Company
Krista Doebbler	Colorado Bureau of Land Mangaement, AML
Bob Arnott	Strategic Environmental Analysis
Kirk Nordstrom,Dr	United States Geologic Survey
Diane McKnight, Dr	University of Colorado
Michelle Hamilton	Town of Silverton
Rob Milofsky, Dr	Fort Lewis College
Mark Rudolf	Colorado Department of Public Health and Environment
Joseph Ryan, Dr	University of Colorado
Cynthia Peterson	Environmental Protection Agency
Rebecca Thomas	Environmental Protection Agency
Betsy Smidinger	Environmental Protection Agency
Doug Benevento	Environmental Protection Agency
Linda Figeroa, Dr	Colorado School of Mines
Rob Runkel, Dr	USGS

Message

From: Marcie Demmy Bidwell [marcie@mountainstudies.org]
Sent: 2/2/2018 10:28:22 PM
To: William Tookey [Ex. 6]; Michelle Hamilton [mhamilton@silverton.co.us]; Louis Fineberg [LFineberg@silverton.co.us]; wsimon@frontier.net; Peter Butler [Ex. 6] diane.McKnight@colorado.edu [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=78c46c044c894668a3588e894beb5e5b-diane.McKnight@colorado.edu]; Joseph Ryan [joseph.ryan@colorado.edu]; Ryan T. Bennett [RBennett@rcflp.com]; Thomas, Rebecca [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=36f74071306a432c9f07eea3fa16ca96-Thomas, Rebecca]; sdempsey@coloradomining.org; Benevento, Douglas [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93dba0f4f0fc41c091499009a2676f89-Benevento,]; Milofsky, Robert [Milofsky_R@fortlewis.edu]; Rudolph - CDPHE, Mark [mark.rudolph@state.co.us]; kchadwick@fs.fed.us; Priscilla Nelson [pnelson@mines.edu]; Dr Figueroa [Ex. 6] Krista Doebbler [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=user735b3804]; Bob Arnott [boba@seaenv.com]; Rob Runkel [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=user77326f33]; Smidinger, Betsy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=08e9600128ad456d9df9ba1cb816aa8e-Bsmiding]; Peterson, Cynthia [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=11d613d49e684c1589f57b933576057c-Peterson, Cynthia]; Benevento, Douglas [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93dba0f4f0fc41c091499009a2676f89-Benevento,]; Kelly, Albert [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=08576e43795149e5a3f9669726dd044c-Kelly, Albe]; Nordstrom, D Kirk [dkn@usgs.gov]
CC: [Ex. 6] Priscilla Sherman [priscilla@mountainstudies.org]
Subject: Meeting Notes- Science and Innovation Center Steering Committee, Feb 1
Attachments: ScInC Steering Comm Notes 2018.02.01.docx; Science Center Prospectus 2018.01.16 v2.docx; Science Center Steering Committee_as of 2018.02.01.xlsx

Hello Steering Committee Members,

Thank you for a great meeting and first call. Please find the notes from the meeting attached, along with the Draft Prospectus for those who would like to provide comments with track changes.

Also, I am attaching a contact list with the names, affiliations, and emails of the participants. Please review this list and let me know if we do not have you listed correctly.

Action items are listed in the notes- we look forward to your participation and input. We will be in touch to schedule a follow up conversation. Thank you for the input!

Thank you, and have a great weekend!
Marcie

Executive Director
Mountain Studies Institute
1309 E. Third Avenue, Durango CO 81301
PO Box 426, Silverton, CO 81433
www.mountainstudies.org | [Ex. 6]

DEFINING THE CHALLENGE AND THE OPPORTUNITY

Challenges for the Solution

- Cold- ice, snow, freezing temperatures, frost heaving
- Treatment of difficult to remove constituents (Mn,Zn) and high metal loads
- Extreme topography, steep slopes, limited flat ground
- Variable land ownership at site of remediation
- Acidity, variable host rock geochemistry
- Difficult to access- steep dirt roads, or lack of loads, snow closures
- No reliable power
- Widely variable influent water quality (no one size fits all, seasonal changes)
- Unknown water balance, variability in timing of recharge and discharge
- Movement of waste sludge from treatment facility out of the watershed or stored locally
- Role of the visitor-dependent recreational economy (winter & summer)
- Understanding pre-mining conditions (in relation to water quality and percentage of metals)
- Knowing where reclamation success will be more achievable

Framing the Challenge for the Process

- Struggle to access materials (water, discharge, wastes) to test their concepts
- Access to land and sources to establish test sites
- Language barriers between IT, technology, testing facilities, and agencies
- Processes for initiating partnerships are lacking or limited, such as contracting arrangements
- Data or results to compare methods is lacking or not comparable
- Liability for testing processes and new solutions
- The volume and proliferations of potential ideas can be overwhelming- which ones deserve to move to the next phase?
- Funding for research and development is hard to find
- Historical data from agencies for ITs are hard to find and share

Sustainability is defined as being capable of being operated

- Independently for a time if necessary
- On a manageable energy budget, ideally onsite via renewables (solar, hydro turbines)
- Operate in all of the weather challenges (hot, cold, UV)
- With a manageable by-product (ideally with market value, and not a sludge)
- Pragmatically priced
- With minimal wildfire interactions with minimal risk
- Without placing the risk on future generations

Strategies (Current and Future)

- Water Quantity Controls
- Active Water Treatment
- Passive Water Treatment
- Biocontrols
- Source controls and targeted remediation

(January 2018 Proposed Prospectus)

SCIENCE & INNOVATION CENTER

Supporting the Evolution of Hardrock Mining and Reclamation in the Rocky Mountain West

BACKGROUND AND NEED

Thousands of legacy mines impact water quality in the San Juan Mountains of Colorado, across the Rocky Mountain West, and mountains around the world. While efforts to date have sought to address isolated aspects of water treatment, surface management, and/or technology, no initiative has embraced a systems approach that combines emerging technologies, business perspectives, and policy reform. Addressing abandoned and draining mines is a highly complex social and environmental problem that demands an integrated, holistic approach. To succeed, we must pivot from isolated improvements to an approach that recognizes the advantages of collaboration, innovation, adaptive management, business perspectives, and solution-driven approaches.

In response to the Gold King Mine wastewater spill of 2015, the Bonita Peak Mining District outside of Silverton, Colorado was designated as a Superfund Site with the support of the community, state and other stakeholders. This incident and resulting fresh focus on the issue of acid mine drainage presents an opportunity to bring stakeholders and regulators together to collaborate on science, technology innovation, and improvements to the regulatory process in order to bring solutions to the ground and the water.

VISION

The Science & Innovation Center will host a consortium of businesses, researchers and agencies to advance technology, catalyze science, and support creative solutions to advance hard rock mine remediation. It will become a center for excellence, a hub of innovation and a base for expertise and technology that will be in high demand to address acid-mine drainage in communities across the West, and around the world. The Science and Innovation Center will:

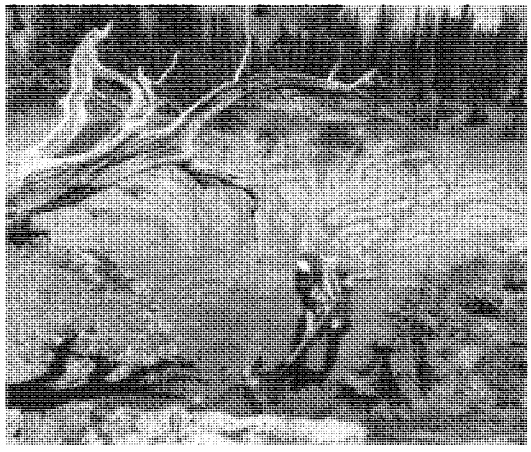
- Seek collaborative innovation to advance the state of remedial options and best practices
- Fill science and technology information gaps regarding remediation and treatment of acid mine drainage
- Identify ways to improve the efficiency of state and federal regulatory processes that oversee remediation efforts
- Support entrepreneurs and partners to design, test, and advance their technologies
- Promote a public-private model of community development that supports local economies and industry

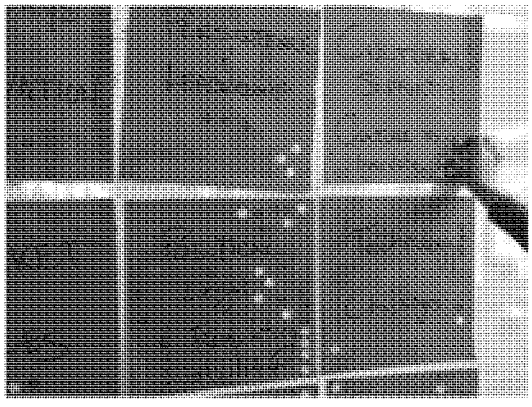
STEERING COMMITTEE AND NEXT STEPS

At the August 2017 Silverton Innovation Expo organized and hosted by Mountain Studies Institute (MSI) and its partners, the concept of the Science & Innovation Center to bring interests together to catalyze comprehensive solutions was discussed. MSI is in the midst of forming and facilitating a Steering Committee that will bring stakeholder representatives together to consider how to make this concept a reality. Initial goals for the Steering Committee include:

- Communicate a collective path forward by defining and articulating the need, workings and outputs of the Center
- Identify key partners on the leading edge of industry, science and technology
- Tap into the resources and opportunities that will lead to financial and other support for the Center

The Steering Committee will help to guide the path forward in establishing the Center. Next steps could include: initiation of a "needs assessment" engaging entrepreneurs, agencies and researchers to understand requirements for resources, commitments, and facilities; facilitating summer 2018 pilot projects; and leveraging the 2nd Silverton Innovation Expo in August 2018 to expand industry, entrepreneurs, agency, and community participation.





PRELIMINARY LIST OF ENTITIES INVITED TO JOIN STEERING COMMITTEE

Town of Silverton, Colorado

San Juan County, Colorado

Environmental Protection Agency

Animas River Stakeholders Group

Animas Watershed Partnership

United States Geological Survey

University of Colorado

Colorado Department of Reclamation, Mining and Safety

Colorado School of Mines

Colorado Department of Public Health and Environment

United States Forest Service

Bureau of Land Management

Fort Lewis College

ABOUT MOUNTAIN STUDIES INSTITUTE

Mountain Studies Institute (MSI) is a 501(c)(3) non-advocacy, not-for-profit mountain research and education institution established in 2002 in Silverton, Colorado. The Institute's mission is to empower scientists, communities, and land managers to advance mountain science to innovate solutions through research, education, and practice. We strive to increase knowledge, understand our unique mountain environments and issues that affect them, and develop solutions for the benefit of our vibrant mountain communities—the Animas River and Silverton community is central to MSI's work. To accomplish these goals, we build partnerships to steward natural and cultural values by engaging citizens, scientists, community leaders, and resource managers in collaborative efforts to put science into action.

CONTACT

Marcie Demmy Bidwell
Executive Director | Mountain Studies Institute
Ex. 6 | marcie@mountainstudies.org
116 East 12th Street, P.O. Box 426, Silverton, CO 81433
www.mountainstudies.org

Mountain Studies Institute
SAN JUAN MOUNTAINS COLORADO

Name		Affiliation	
Willy Tookey		San Juan County	
Louis Feinstein		Town of Silverton	
Peter Butler, Dr		Animas River Stakeholders Group	
Bill Simon		Animas River Stakeholders Group	
Kara Chadwick		San Juan National Forest	
Stan Dempsey		Colorado Mining Association	
Priscilla Nelson		Colorado School of Mines	
Ryan Bennett		Resource Capital Funds/San Juan Land Holding Company	
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Bob Arnott		Strategic Environmental Analysis	
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Cynthia Peterson		Environmental Protection Agency	
Rebecca Thomas		Environmental Protection Agency	
Betsy Smidinger		Environmental Protection Agency	
Doug Benevento	Environmental	Environmental Protection Agency	
Linda Figeroa, Dr		Colorado School of Mines	
Rob Runkel, Dr		USGS	

		Email
		sanjuancounty@frontier.net
		lfienberg@silverton.co.us
		Ex. 6 @gmail.com
		wsimon@frontier.net
		kchadwick@fs.fed.us
		sdempsey@coloradomining.org
		pnelson@mines.edu
		rtbenn@comcast.net
		kdobble@blm.gov
		boba@seaenv.com
		dkn@usgs.gov
		Diane McKnight <Diane.Mcknight@colorado.edu>
		Michelle Hamilton <mhamilton@silverton.co.us>
		milofsky_r@fortlewis.edu
		mark.rudolph@state.co.us
		joseph.ryan@colorado.edu
		peterson.cynthia@epa.gov
		thomas.rebecca@epa.gov
		smidinger.betsy@epa.gov
		benevento.douglas@epa.gov
		Linda Figueroa <Ex. 6 @gmail.com>
		Rob Runkel <runkel@usgs.gov>

Stakeholder Type	Affliction	Email	Phone	Comments
Stephen Dyment	EPA Denver	dyment.stephen@epa.gov	303-312-7044	
Rebecca Thomas	EPA Denver	thomas.rebecca@epa.gov		
Luke Danielson	Western State			
Dennis Wittmer	Daniels College		303-871-2431	
Doug Benevento	EPA Denver	doug.benevento@epa.gov	303-312-6312	Region 8 director
Stratton Edwards	DC consulting		202-740-8309	Capital Hill Consulting Group
Deb Thomas	EPA Denver	thomas.deb@epa.gov	303-312-6532	Deputy Director, region 8

SCIENCE &
INNOVATION CENTER

Supporting the Evolution of Hardrock Mining and Reclamation in the Rocky Mountain West

February 1, 2018

Steering Committee Conference Call

On the phone: Marcie Bidwell, Paul Orbuch, Michelle Hamilton, Page Buono, Peter Butler, Kara Chadwick, Priscilla Nelson, Ryan Bennett, Rob Milosky, Rebecca Thomas, Joe Ryan, Bill Simon, Bob Arnott, Peter Butler, Cynthia Peterson, Mark Rudolph, Kris Doebbler, Stan Dempsey, Rob Runkel, and Betsy Smidinger on behalf of Doug Benevento *(listed at end of notes or contact sheet for full info)*

Center Scoping Issues to be Considered

- Distinction between legacy and active mining issues– Bill Simon
- Focus on mine acid drainage and/or mine waste technology for remediation – Peter Butler
- Evaluate what synergistic and divergent efforts are currently underway – Marcie Bidwell
- Draw from experiences in other institutes and countries– Ryan Bennett
- Consider federal technology evaluation new processes - Kris Doebbler and Rebecca Thomas

Recommendations for additions to the steering committee:

- Kim White, Silverton Schools – Michelle Hamilton
- Trout Unlimited, Jason Willis or Ty Churchwell- Rob Runkle,
- Mining Industry Representative (Kinross, Larry Perino/Pat Maily) – Stan Dempsey/Ryan Bennett

(MSI to follow up with recommenders on all three above)

Action Items:

- Review the prospectus (attached) and if feedback at present, please send to Marcie and Paul
- Marcie and Paul to schedule individual phone interviews with Steering Committee entities during month of February. List of questions to be provided in advance. Outcome to be Steering Committee Memo, White Paper and/or expanded prospectus. (Consider adding a timeline to next document.)
- Save the Date- 2018 Silverton Innovation Expo August 28-30 – Steering Committee meeting and dinner
- Next conference call –***DATE CHANGE*** **to Wednesday April 11th 10 am**
  (April 4 conflicted with CMA's 120TH NATIONAL WESTERN MINING CONFERENCE)

Upcoming Events of Interest:

- 120th National Western Mining Conference & Exhibition, Colorado Mining Association, April 3-5th http://www.coloradomining.org/general/custom.asp?page=NWMC_2018

- The Mining & Metallurgical Society of America, Colorado School of Mines- April 26th http://www.mmsa.net/

- San Juan Mining Conference, MSI/Uncompahgre Watershed Partnership, May 2-4 http://www.mountainstudies.org/sjmrc

- Silverton Expo – Mountain Studies Institute, August 28-30 http://www.mountainstudies.org/expo
- International Mine Water Association Annual Conference, September 10-14, Pretoria, South Africa https://eventegg.com/imwa-annual-conference/
- Mining Cleantech Challenge Call for Applications announcement, Announcement Date- 1-2-18; See announcement for details or contact Emily Long at Emily Long emily@coloradocleantech.com

Names and Affiliations of Call Participants

Name	Affiliation
Willy Tookey	San Juan County
Louis Feinstein	Town of Silverton
Peter Butler, Dr	Animas River Stakeholders Group
Bill Simon	Animas River Stakeholders Group
Kara Chadwick	San Juan National Forest
Stan Dempsey	Colorado Mining Association
Priscilla Nelson	Colorado School of Mines
Ryan Bennett	Resource Capital Funds/San Juan Land Holding Company
Krista Doebbler	Colorado Bureau of Land Mangaement, AML
Bob Arnott	Strategic Environmental Analysis
Kirk Nordstrom,Dr	United States Geologic Survey
Diane McKnight, Dr	University of Colorado
Michelle Hamilton	Town of Silverton
Rob Milofsky, Dr	Fort Lewis College
Mark Rudolf	Colorado Department of Public Health and Environment
Joseph Ryan, Dr	University of Colorado
Cynthia Peterson	Environmental Protection Agency
Rebecca Thomas	Environmental Protection Agency
Betsy Smidinger	Environmental Protection Agency
Doug Benevento	Environmental Protection Agency
Linda Figeroa, Dr	Colorado School of Mines
Rob Runkel, Dr	USGS

Message

From: paul orbuch [Ex. 6]
Sent: 2/9/2018 5:41:44 PM
To: [Ex. 6] mhamilton@silverton.co.us; lfineberg@silverton.co.us; [Ex. 6] [Ex. 6] diane.McKnight@colorado.edu [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=78c46c044c894668a3588e894beb5e5b-diane.McKnight@colorado.edu]; joseph.ryan@colorado.edu; rbennett@rcflp.com; Thomas, Rebecca [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=36f74071306a432c9f07eea3fa16ca96-Thomas, Rebecca]; sdempsey@coloradomining.org; Benevento, Douglas [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93dba0f4f0fc41c091499009a2676f89-Benevento,]; milofsky_r@fortlewis.edu; mark.rudolph@state.co.us; Chadwick, Kara -FS [kchadwick@fs.fed.us]; Priscilla Nelson [pnelson@mines.edu]; [Ex. 6]; kdoebbler@blm.gov; SEAMail [boba@seaenv.com]; Rob Runkel [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=user77326f33]; Smidinger, Betsy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=08e9600128ad456d9df9ba1cb816aa8e-Bsmiding]; Peterson, Cynthia [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=11d613d49e684c1589f57b933576057c-Peterson, Cynthia]; Kelly, Albert [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=08576e43795149e5a3f9669726dd044c-Kelly, Albe]; dkn@usgs.gov
CC: marcie@mountainstudies.org [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=c87b9fe7de2b40de9e216ff0610e6ef1-marcie@moun]; Priscilla Sherman [priscilla@mountainstudies.org]
Subject: Mountain Studies Institute Steering Committee Questionnaire
Attachments: MSI Steering Committee Questions Final2..docx; Science Center Prospectus 2018.01.16 v2.docx

Top of Form

Bottom of Form

Greetings MSI Science and Innovation Center Steering Committee Members:

As we discussed on the February 1 conference call, attached please find a set of questions on which we seek a response from each organization represented on the Steering Committee. Please combine your views with the other individuals from your organization (where applicable) to produce only one response.

Marcie Bidwell and I will reach out to each organization shortly to schedule a time to talk by phone or meet in person during the month of February. We will work with you to complete a response or you may also respond in writing on your own. Marcie or I would still then want to review the response with you by phone or in person to ensure we understand your perspective.

Great appreciation in advance to all of you for putting substantive thought into the responses. The wisdom you provide will go into a document that will educate us all on the possibilities, challenges and benefits of a Center and help guide our course of action. We will not share your responses with others on the Steering Committee but you are welcome to do so if you wish. The document produced will be presented without attribution so please feel free to share deep thoughts.

We will review this document and determine next steps on our conference call on **Wednesday, April 11 at 10am mountain**. NOTE DATE CHANGE from April 5 that was discussed on first conference call. The 5th conflicted with CMA's National Western Mining Conference and Exhibition that many of you will be attending.

Please contact Marcie or I if you have questions but you will also be hearing from us very soon.

Paul Orbuch
Orbuch Consulting, LLC (on behalf of MSI)
Boulder, Colorado

Ex. 6

Attached: Questionnaire and Center prospectus

Mountain Studies Institute
Science and Innovation Center Steering Committee
February 2018 Questionnaire
(Can be completed in writing or in course of phone conference or in-person meeting to be scheduled with MSI. If in writing, MSI will still schedule meeting/phone call to discuss answers.)

Steering Committee Member(s) Name(s) and Organization
(One response per organization please)

Interview Questions (please take as much space as necessary for written responses)
a) *Please describe the constituency you represent on the Steering Committee*

b) Please list your organization's highest priority hard rock mining challenges, in order of importance.

c) Are there lower priority challenges that can be addressed or other benefits that a Center can provide that would bring value to you and your constituency?

d) What are the key challenges you foresee in developing a Center to address your hard rock mining priorities? (e.g., staffing, funding, physical facilities, legal, governmental, etc.).

e) Are you aware of other initiatives or entities with similar goals/missions? How could the Steering Committee and eventually the Center itself best work with these entities going forward?

f) There are potentially a number of ways to structure and/or operate a Center or Centers. These include, a physical location near mine sites, a virtual network, a hosted

entity, etc., or a combination of the foregoing. There are advantages and disadvantages to each of these options. Please provide your list of advantages and disadvantage to each of these three options or other structure options you identify.

g) Resource and funding for scoping, start up and long term operations of a Center will be required. Please provide your suggestions for short and long term funding and resource options. Short term might include governmental, industry, academic and philanthropic options. Long term could include those options, and/or some type of fee structure for users of the Center. Please list any other funding and resource options you see potential for that are not suggested here.

h) If a Center(s) is to succeed, what are the key partners in your view (from the Steering Committee or otherwise) that must have a primary role in its development and operation? And if you envision multiple Centers, please list your key partners relevant to each Center.

i) What is your organization's level of willingness to engage in the development of a Center(s) on a scale of 1 (not really willing) to 10 (extremely willing)?? And by engagement we mean things, for example, such as serving on a work group to develop a charter or operating details for the Center and/or serving on an eventual Board of Directors of a Center.

j) What other issues do you think should be surfaced for the Steering Committee to consider regarding the potential for a Center? And, any comments on the prospectus that has been circulated so that we can create a new and improved version?

(January 2018 Proposed Prospectus)

SCIENCE & INNOVATION CENTER

Supporting the Evolution of Hardrock Mining and Reclamation in the Rocky Mountain West

BACKGROUND AND NEED

Thousands of legacy mines impact water quality in the San Juan Mountains of Colorado, across the Rocky Mountain West, and mountains around the world. While efforts to date have sought to address isolated aspects of water treatment, surface management, and/or technology, no initiative has embraced a systems approach that combines emerging technologies, business perspectives, and policy reform. Addressing abandoned and draining mines is a highly complex social and environmental problem that demands an integrated, holistic approach. To succeed, we must pivot from isolated improvements to an approach that recognizes the advantages of collaboration, innovation, adaptive management, business perspectives, and solution-driven approaches.

In response to the Gold King Mine wastewater spill of 2015, the Bonita Peak Mining District outside of Silverton, Colorado was designated as a Superfund Site with the support of the community, state and other stakeholders. This incident and resulting fresh focus on the issue of acid mine drainage presents an opportunity to bring stakeholders and regulators together to collaborate on science, technology innovation, and improvements to the regulatory process in order to bring solutions to the ground and the water.

VISION

The Science & Innovation Center will host a consortium of businesses, researchers and agencies to advance technology, catalyze science, and support creative solutions to advance hard rock mine remediation. It will become a center for excellence, a hub of innovation and a base for expertise and technology that will be in high demand to address acid-mine drainage in communities across the West, and around the world. The Science and Innovation Center will:

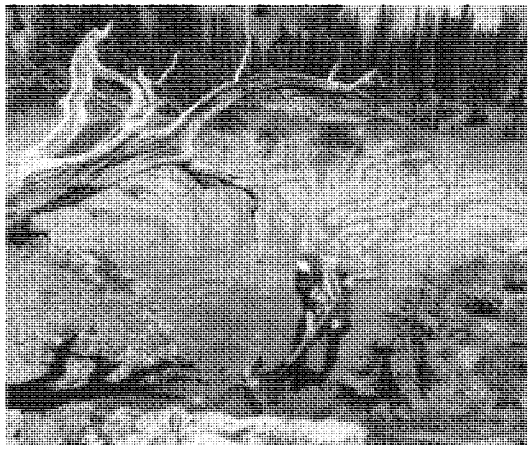
- Seek collaborative innovation to advance the state of remedial options and best practices
- Fill science and technology information gaps regarding remediation and treatment of acid mine drainage
- Identify ways to improve the efficiency of state and federal regulatory processes that oversee remediation efforts
- Support entrepreneurs and partners to design, test, and advance their technologies
- Promote a public-private model of community development that supports local economies and industry

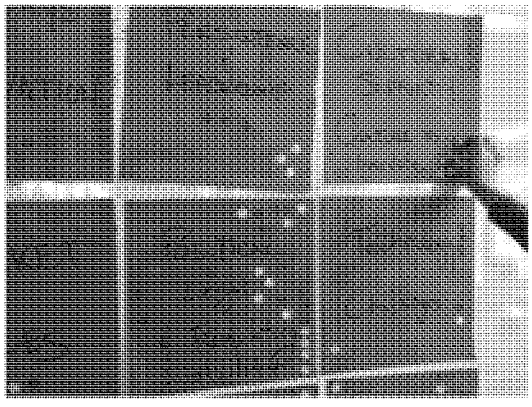
STEERING COMMITTEE AND NEXT STEPS

At the August 2017 Silverton Innovation Expo organized and hosted by Mountain Studies Institute (MSI) and its partners, the concept of the Science & Innovation Center to bring interests together to catalyze comprehensive solutions was discussed. MSI is in the midst of forming and facilitating a Steering Committee that will bring stakeholder representatives together to consider how to make this concept a reality. Initial goals for the Steering Committee include:

- Communicate a collective path forward by defining and articulating the need, workings and outputs of the Center
- Identify key partners on the leading edge of industry, science and technology
- Tap into the resources and opportunities that will lead to financial and other support for the Center

The Steering Committee will help to guide the path forward in establishing the Center. Next steps could include: initiation of a "needs assessment" engaging entrepreneurs, agencies and researchers to understand requirements for resources, commitments, and facilities; facilitating summer 2018 pilot projects; and leveraging the 2nd Silverton Innovation Expo in August 2018 to expand industry, entrepreneurs, agency, and community participation.





PRELIMINARY LIST OF ENTITIES INVITED TO JOIN STEERING COMMITTEE

Town of Silverton, Colorado

San Juan County, Colorado

Environmental Protection Agency

Animas River Stakeholders Group

Animas Watershed Partnership

United States Geological Survey

University of Colorado

Colorado Department of Reclamation, Mining and Safety

Colorado School of Mines

Colorado Department of Public Health and Environment

United States Forest Service

Bureau of Land Management

Fort Lewis College

ABOUT MOUNTAIN STUDIES INSTITUTE

Mountain Studies Institute (MSI) is a 501(c)(3) non-advocacy, not-for-profit mountain research and education institution established in 2002 in Silverton, Colorado. The Institute's mission is to empower scientists, communities, and land managers to advance mountain science to innovate solutions through research, education, and practice. We strive to increase knowledge, understand our unique mountain environments and issues that affect them, and develop solutions for the benefit of our vibrant mountain communities—the Animas River and Silverton community is central to MSI's work. To accomplish these goals, we build partnerships to steward natural and cultural values by engaging citizens, scientists, community leaders, and resource managers in collaborative efforts to put science into action.

CONTACT

Marcie Demmy Bidwell
Executive Director | Mountain Studies Institute
Ex. 6 | marcie@mountainstudies.org
116 East 12th Street, P.O. Box 426, Silverton, CO 81433
www.mountainstudies.org

Mountain Studies Institute
SAN JUAN MOUNTAINS COLORADO

Message

From: Rob Runkel [runkel@usgs.gov]
Sent: 2/7/2018 8:36:52 PM
To: marcie@mountainstudies.org [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=c87b9fe7de2b40de9e216ff0610e6ef1-marcie@moun]
CC: William Tookey [Ex. 6]; Michelle Hamilton [mhamilton@silverton.co.us]; Louis Fineberg [LFineberg@silverton.co.us]; [Ex. 6] Peter Butler [Ex. 6]; diane.McKnight@colorado.edu [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=78c46c044c894668a3588e894beb5e5b-diane.McKnight@colorado.edu]; Joseph Ryan [joseph.ryan@colorado.edu]; Ryan T. Bennett [RBennett@rcflp.com]; Thomas, Rebecca [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=36f74071306a432c9f07eea3fa16ca96-Thomas, Rebecca]; sdempsey@coloradomining.org; Benevento, Douglas [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93dba0f4f0fc41c091499009a2676f89-Benevento,]; Milofsky, Robert [Milofsky_R@fortlewis.edu]; Rudolph - CDPHE, Mark [mark.rudolph@state.co.us]; kchadwick@fs.fed.us; Priscilla Nelson [pnelson@mines.edu]; Dr Figueroa [Ex. 6]; Krista Doebbler [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=user735b3804]; Bob Arnott [boba@seaenv.com]; Smidinger, Betsy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=08e9600128ad456d9df9ba1cb816aa8e-Bsmiding]; Peterson, Cynthia [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=11d613d49e684c1589f57b933576057c-Peterson, Cynthia]; Benevento, Douglas [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93dba0f4f0fc41c091499009a2676f89-Benevento,]; Kelly, Albert [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=08576e43795149e5a3f9669726dd044c-Kelly, Albe]; Nordstrom, D Kirk [dkn@usgs.gov]; [Ex. 6] Priscilla Sherman [priscilla@mountainstudies.org]
Subject: Re: Meeting Notes- Science and Innovation Center Steering Committee, Feb 1

Thanks Marcie -- here are some comments on the prospectus:

* I think its important to have "Silverton" as part of the center's name. I looked back at an old version of the prospectus and it was indeed named the "Silverton Science & Innovation Center". I guess "Silverton" was dropped in the making of the acronym, but I think having it as part of name is more important than the acronym.

* Bill Simon brought up the distinction between legacy and active mining. The initial part of the subtitle - "Supporting the Evolution of Hardrock Mining.." - makes me think of active/future mining; the first sentence explicitly refers to "legacy mines". I'm thinking the focus is primarily on legacy, but that's up for us all to decide. If the focus is on legacy, a potential subtitle is: "Supporting the Reclamation of Abandoned Minelands in the Rocky Mountain West".

* Much of the 2017 Expo was focused on water treatment technologies and that's certainly appropriate. But we should include other parts of the problem that are in need of innovative solutions -- e.g. revegetating disturbed areas, stream rehab/erosion, instream flow/fish habitat, etc.

cheers,

Rob

Rob Runkel
Research Hydrologist
U.S. Geological Survey
runkel@usgs.gov
[Ex. 6]
http://profile.usgs.gov/runkel

On Fri, 2 Feb 2018, Marcie Demmy Bidwell wrote:

> Hello Steering Committee Members,
> Thank you for a great meeting and first call. Please find the notes from the meeting attached, along with the Draft Prospectus for those who would like to provide comments with track changes.
> Also, I am attaching a contact list with the names, affiliations, and emails of the participants. Please review this list and let me know if we do not have you listed correctly.
> Action items are listed in the notes- we look forward to your participation and input. We will be in touch to schedule a follow up conversation. Thank you for the input!
>
> Thank you, and have a great weekend!
> Marcie
> Executive Director
> Mountain Studies Institute
> 1309 E. Third Avenue, Durango CO 81301
> PO Box 426, Silverton, CO 81433
> www.mountainstudies.org<http://www.mountainstudies.org> | Ex. 6
>
>
>
>
> DEFINING THE CHALLENGE AND THE OPPORTUNITY
> Challenges for the Solution
>
> * Cold- ice, snow, freezing temperatures, frost heaving
> * Treatment of difficult to remove constituents (Mn,Zn) and high metal loads
> * Extreme topography, steep slopes, limited flat ground
> * Variable land ownership at site of remediation
> * Acidity, variable host rock geochemistry
> * Difficult to access- steep dirt roads, or lack of loads, snow closures
> * No reliable power
> * Widely variable influent water quality (no one size fits all, seasonal changes)
> * Unknown water balance, variability in timing of recharge and discharge
> * Movement of waste sludge from treatment facility out of the watershed or stored locally
> * Role of the visitor-dependent recreational economy (winter & summer)
> * Understanding pre-mining conditions (in relation to water quality and percentage of metals)
> * Knowing where reclamation success will be more achievable
> Framing the Challenge for the Process
>
> * Struggle to access materials (water, discharge, wastes) to test their concepts
> * Access to land and sources to establish test sites
> * Language barriers between IT, technology, testing facilities, and agencies
> * Processes for initiating partnerships are lacking or limited, such as contracting arrangements
> * Data or results to compare methods is lacking or not comparable
> * Liability for testing processes and new solutions
> * The volume and proliferations of potential ideas can be overwhelming- which ones deserve to move to the next phase?
> * Funding for research and development is hard to find
> * Historical data from agencies for ITs are hard to find and share
> Sustainability is defined as being capable of being operated
>
> * Independently for a time if necessary
> * On a manageable energy budget, ideally onsite via renewables (solar, hydro turbines)
> * Operate in all of the weather challenges (hot, cold, UV)
> * With a manageable by-product (ideally with market value, and not a sludge)
> * Pragmatically priced
> * With minimal wildfire interactions with minimal risk
> * Without placing the risk on future generations
> Strategies (Current and Future)
>
> * Water Quantity Controls
> * Active Water Treatment
> * Passive Water Treatment
> * Biocontrols
> * Source controls and targeted remediation
>
>

Message

From: paul orbuch [Ex. 6]
Sent: 4/17/2018 6:01:18 PM
To: William Tookey [Ex. 6]; Michelle Hamilton [mhamilton@silverton.co.us]; Louis Fineberg [LFineberg@silverton.co.us]; [Ex. 6]; Peter Butler [Ex. 6]; diane.McKnight@colorado.edu [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=78c46c044c894668a3588e894beb5e5b-diane.McKnight@colorado.edu]; Joseph Ryan [joseph.ryan@colorado.edu]; Ryan T. Bennett [RBennett@rcflp.com]; Thomas, Rebecca [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=36f74071306a432c9f07eea3fa16ca96-Thomas, Rebecca]; sdempsey@coloradomining.org; Benevento, Douglas [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=93dba0f4f0fc41c091499009a2676f89-Benevento,]; Milofsky, Robert [Milofsky_R@fortlewis.edu]; Rudolph - CDPHE, Mark [mark.rudolph@state.co.us]; kchadwick@fs.fed.us; Priscilla Nelson [pnelson@mines.edu]; Dr Figueroa [Ex. 6]; Krista Doebbler [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=user735b3804]; Bob Arnott [boba@seaenv.com]; Rob Runkel [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=user77326f33]; Smidinger, Betsy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=08e9600128ad456d9df9ba1cb816aa8e-Bsmiding]; Peterson, Cynthia [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=11d613d49e684c1589f57b933576057c-Peterson, Cynthia]; Kelly, Albert [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=08576e43795149e5a3f9669726dd044c-Kelly, Albe]; Nordstrom, D Kirk [dkn@usgs.gov]; Devon Horntvedt [Devon.Horntvedt@newmont.com]; jwillis@tu.org; marcie@mountainstudies.org [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=c87b9fe7de2b40de9e216ff0610e6ef1-marcie@moun]; Page Buono [page@mountainstudies.org]; Priscilla Sherman [priscilla@mountainstudies.org]
Subject: April 11 Conference Call Notes MSI Innovation Center Steering Committee
Attachments: Steering Committee Meeting Notes 4.11.18.pdf

Thanks all for joining the conference call last week. Attached is a two page report with the key outcomes and issues raised. A quick summary is below.

Summary of Outcomes from Call:
• Business Plan/Roadmap subgroup formed (may hold first meeting in Denver, April 25)
• Science and Innovation Center Prospectus to be updated and revised
• MSI to develop a spreadsheet of funding options
• Summary/talking points document to be developed from Questionnaire responses
• Some Steering Committee members to attend Good Sam/Innovation Week events at School of Mines on April 26.
• Next Steering Committee call TBD, likely to be review of Business Plan/Roadmap
• Steering Committee panel and dinner at MSI Innovation Expo in Silverton, August 28-30

Please let me know if you think we missed anything critical in the outcomes or if you have any questions. We will be in touch soon with items for review and a proposed date for a next call.

Keep the feedback and ideas coming even in between our calls. Thank you so much!

Paul Orbuch
Orbuch Consulting, LLC (on behalf of MSI)
[Ex. 6]

SCIENCE & INNOVATION CENTER

Supporting the Evolution of Hardrock Mining and Reclamation in the Rocky Mountain West

April 11, 2018

Steering Committee Conference Call

In attendance: Ryan Bennett, Resource Partners, Mark Rudolph, CDPHE, Rob Milofsky, FLC, Bob Arnott, Strategic Environmental Analysis, Rob Runkel, USGS, Kirk Nordstrom, USGS , Jason Willis, TU, Devon Horntvedt, Newmont, Krista Doebbler, BLM, Michelle Hamilton, Town of Silverton, Peter Butler and Bill Simmons, ARSG , Marcie Bidwell, Page Buono and Shular Roberts, MSI and Paul Orbuch, MSI Facilitator

Summary of Outcomes from Call:

- Business Plan/Roadmap subgroup formed
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Questionnaire Response Review:

- Range of takeaways and desire for more time to review. MSI to develop summary and talking points for Steering Committee use.
- Raised Rocky Mountain Biological Laboratory as a model. http://www.rmbl.org/

New v. Legacy Mine Issue:

- Steering Committee consensus that new technologies used to address discharges at new or legacy mines are closely related and can overlap in many cases. Meeting today's new mining challenge can be the same as addressing tomorrow legacy mine challenge (and vice versa) from a technology standpoint.
- Science and Innovation Center should look to demonstrate value to society by helping to develop mine waste solutions, whether new or legacy related.
- Make sure to consider technology and approaches that can reduce some mine waste even if they cannot reduce all mine waste. Some improvement in water quality/partial compliance is to be valued as regulators can require removal of all metals and the last 10-20% of clean ups can be difficult and expensive to achieve.
- Be sure to understand what remediation has worked in the past, what has not and why.

Business Plan/Roadmap Discussion

- Subgroup formed to develop internal guidance report specifics that could include the following elements: objectives, concept/need statement, areas of service, competitiveness analysis, governance, financial plan, year one objectives, rolling five year objectives, and strengths-weaknesses-opportunities-threats (SWOT analysis).
- Potential for a planning grant to fund report from San Juan County/Silverton
- Aim to develop document over the next four months with input and review opportunities for entire Steering Committee along the way.
- Initial list of Steering Committee subgroup volunteers includes Bob Arnott, Michelle Hamilton, Devon Horntvedt, and Marci Bidwell.

MSI's Silverton Innovation Expo – August 28-30

- Looking for input, ideas and participation from Steering Committee members
- See http://www.mountainstudies.org/expo
- Panel of attending Steering Committee to give update and take feedback on Center
- Steering Committee Dinner where we can get into detail

Bonita Peak Mining District Innovative Technologies https://semspub.epa.gov/work/08/100003642.pdf

- Already 20 inquires on using new EPA procedure to identify alternatives to lime treatment process
- Is there an opportunity for EPA to review this process at MSI Innovation Expo?

MSI Fundraising Report

- Taking recommendations from memo, looking into REDI planning grant, looking for opportunities to apply to foundations or private foundations, Community Solutions Grant, LORE Foundation
- MSI looking for a staff coordinator or consultant for planning process - $50- $120 range for 1 year to 18 months, Expo, start-up weekends and shepherd business plan, and coordinating volunteers.

Additional Resources/Events Referenced:

- San Juan Mining & Reclamation Conference (Creed): http://www.mountainstudies.org/events/sjmrc2018
- MSI Innovation Expo: http://www.mountainstudies.org/expo
- Bonita Peak Mining District Innovative Technologies: https://semspub.epa.gov/work/08/100003642.pdf
- School of Mines Innovation Week https://calendar.mines.edu/event/innovation-week-at-mines/
- Good Samaritan Protection to Enhance Abandoned Mine Land Cleanup—Finding a Path Forward http://mmsa.net/pdfs/Announcement_DrftFnl_02-13-18.pdf